

**VERSION 3**



**415S1**

## **Universal Controller for 415VAC 3-Phase Motors**

used on Light Commercial Doors, Industrial Roller Shutters,  
Sectional Doors, Garage and Sliding Doors

## Features

- Adjustable auto close
- Auto-reset thermal protection
- External key switch for safety and security
- Dead man controls for open and close buttons
- Automatic ground and travel distance calibration
- Photocell, pedestrian and wireless remote control inputs
- Supports NC or NO limit switch inputs or travel timer setup
- Aux relay output to control courtesy lights and other accessories
- 24VDC output to supply external accessories such as loop detectors, swipe cards etc
- Customised models available upon request

## Description

The 415S1E industrial controller uses German designed ABB contactors and thermal overloads with phase failure compensation to control the 3-phase motor. The controller uses a triple protection system with a mechanical interlock, electrical interlock and an electronic interlock.

A toroidal transformer is used to power the control card and contactors. Using a toroidal transformer offers the following advantages:

- Excellent efficiency and low leakage losses reducing your electricity consumption
- High isolation which protects the electronics from noisy power lines
- Low magnetic field radiation and no acoustic noise enabling the controller to pass EMC and other stringent radiation tests

This is the quality you should demand when using 3-phase motor controllers.

## Important warning and safety instructions

All installations and testing must be done only after reading and understanding all instructions carefully. All wirings should be done only by trained technical personnel. Failing to follow instructions and the safety warnings may result in serious injury and/or damage to property.

Elsema Pty Ltd shall not be liable for any injury, damage, cost, expense or any claim whatsoever to any person or property which may result from improper use or installation of this product.

Risk in the goods purchased shall unless otherwise agreed in written pass to the buyer upon delivery of the goods.

# Part Numbers:

Part Number	Description	Application
415S1E-2.4	Suitable for 3-phase motors up to 1 kW (1.3HP). Thermal overload adjustable from 1.6-2.4Amps. <ul style="list-style-type: none"><li>• IP66 rated plastic enclosure</li><li>• UP / DOWN / STOP external push buttons</li><li>• External key switch</li></ul>	Light Commercial Doors, Heavy Duty Cycle Roller Shutters, Sectional Doors, Garage and Sliding doors
415S1E-4.0	Suitable for 3-phase motors up to 1.6kW (2.2HP). Thermal overload adjustable from 2.4-4.0Amps. <ul style="list-style-type: none"><li>• IP66 rated plastic enclosure</li><li>• UP / DOWN / STOP external push buttons</li><li>• External key switch</li></ul>	Light Commercial Doors, Heavy Duty Cycle Roller Shutters, Sectional Doors, Garage and Sliding doors

## Key switch



**AUTO:** When the key is in the AUTO position the controller (motor) can be operated by:

- Wireless remote control if the receiver is installed
- Push button input on the circuit board which can be used to connect external push buttons, swipe card, loop detectors or keypads
- Pedestrian access input on the circuit board which can be used to connect external push buttons, swipe card, loop detectors or keypads
- Stop button on the front of the case

In AUTO mode the Open and Close button on the front of the case are disabled.

**OFF:** When the key is in the OFF position, the controller (motor) does not work. The push buttons and the wireless remotes are disabled.

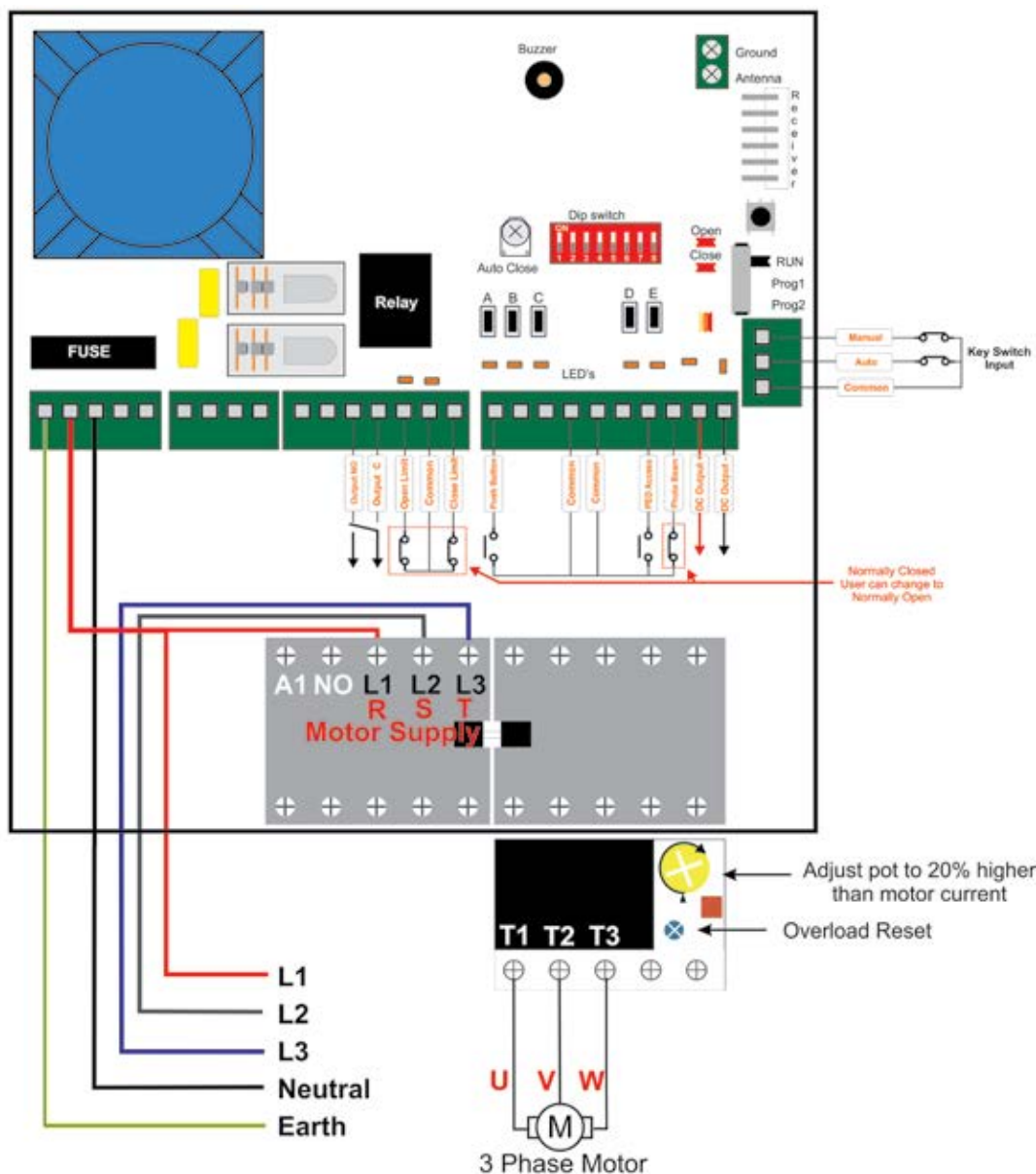
**MANUAL:** When the key is in the MANUAL position the controller (motor) will only operate with the push buttons that are on the front panel. Wireless remote controls are disabled.

Any figures or estimates given for performance of goods are based upon the company's experience and is what the company obtains on tests. The company will not accept liability for failure to comply with the figures or estimates due to the nature of variable conditions affecting for example Radio Remote Controls.

Please keep this setup instruction for future reference.

# Block Diagrams

415S1E – used with 415VAC 3-Phase motor



<b>240VAC Supply</b>	Supply connection to power the 415S1E controls
<b>Auxiliary Output</b>	Used to connect a lock or courtesy light. Relay Contacts, Common and Normally Open
<b>Limit Switch</b>	If limit switches are used connect them to this terminal. Factory Default is Normally Closed
<b>Push Button</b>	Used to connect an external push button to operate the gate or door. Normally open input.
<b>Common</b>	Common terminal for all inputs
<b>Pedestrian Access</b>	Used to connect an external push button to open gate or door partially for pedestrian access. Normally Open input.
<b>Photo Electric Beam</b>	Used to connect a photo electric beam. Default Normally Closed input. User can change to Normally Open.
<b>DC Output</b>	24VDC / 150mA. Use to supply accessories. (Use Elsema Reg12 to convert this output to 12VDC)
<b>ABB Contactor</b>	ABB industrial grade contactor with mechanical and electrical interlock.
<b>Thermal Overload</b>	Thermal overload with adjustable overload setting range of 2.4-4Amps
<b>Motor U</b>	Used to connect U of a 415VAC motor
<b>Motor V</b>	Used to connect V of a 415VAC motor
<b>Motor W</b>	Used to connect W of a 415VAC motor
<b>Slide Switch</b>	Used to access the control card features.
<b>Input Status LEDs</b>	Indicates inputs status.
<b>Tact Switches</b>	Test button for inputs in Run mode and used to access the features in program mode. A = Push Button, B = Open Only, C = Close Only, D = Stop, E = Pedestrian Access
<b>Auto Close trimpot</b>	Used to adjust the Auto Close time.
<b>Dip Switch</b>	Used to access the control card features.
<b>Open, Close LEDs</b>	Indicates Opening or Closing cycle.
<b>Enter button</b>	Used to change features in programming mode.
<b>Receiver</b>	Used to connect Elsema's receivers to operate the control card with a remote control. Use Elsema's Pentacode series.
<b>Antenna</b>	Used to connect an external antenna for the plug in receiver.
<b>Buzzer</b>	Indicates that change of features was successful.
<b>Fuse</b>	Slow blow 2 Amps fuse.
<b>Motor supply input</b>	3-phase input to supply the motor.

# Setup Instructions

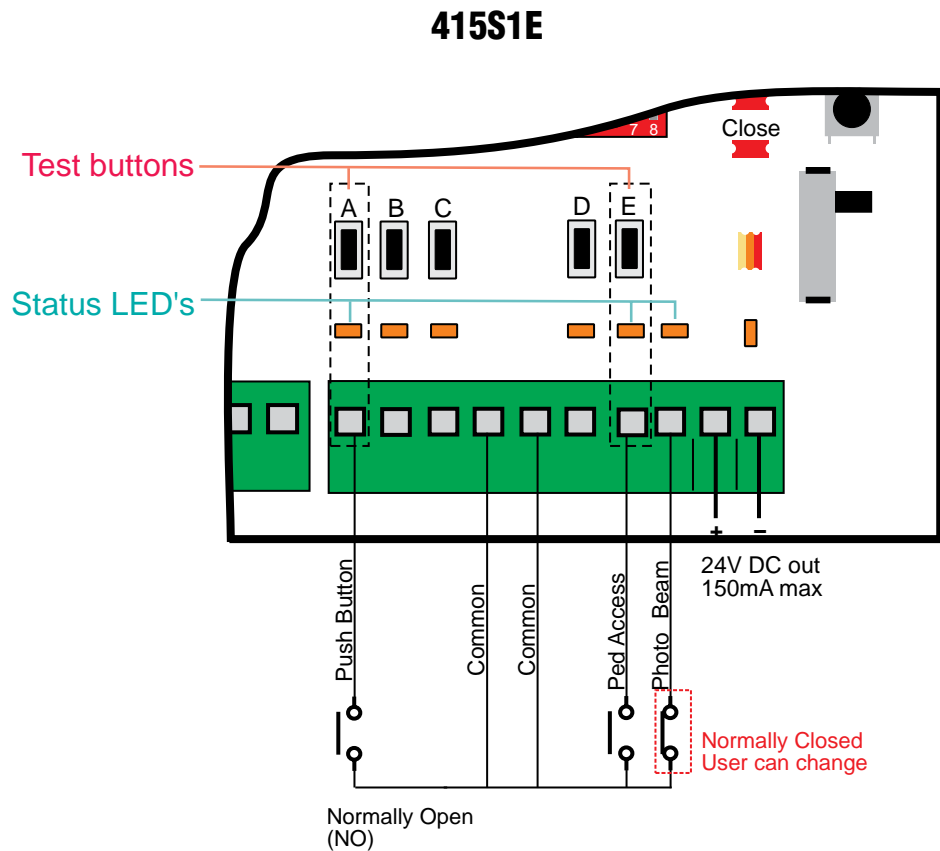
## Electrical Wiring



Always switch off power before doing any wiring.  
Make sure that all the wiring is completed and that the motor is connected to the control card. **Recommended wire strip length should be 10mm for all connections to the plug in terminal blocks.**

## Inputs and Outputs Diagram

The diagram below shows the inputs and outputs available, their factory default settings, status LED's and the test button for each input.



### Open, Close and Remote Control Inputs

The open and close push buttons are factory default setting to operate as press and hold. This means the user will need to keep pressing the input for the gate/door to operate.

The remote control inputs are factory default setting to operate as latching. This means the user presses the remote button once and the gate/door will fully open or fully close.

The press and hold and latching functions can be changed by following the steps and table below:

- 1. Set dip switch 7 and 8 “ON” and 1 to 6 “OFF”
- 2. Set the mode switch to program mode 1
- 3. Set dip switch 1, 2, 3 and 4 as shown in the table below

	Dip switch 1	Dip switch 2	Dip switch 3	Dip switch 4
Open Button	On = Press and Hold Off = Latching			
Close Button		On = Press and Hold Off = Latching		
Remote Button 1			On = Press and Hold (Button 1 Open Only) Off = Latching	
Remote Button 2				On = Press and Hold (Button 2 Close Only) Off = Latching

Orange text indicates factory default setting

- 4. Press the Enter button.
- 5. Buzzer will beep to confirm the change was successful
- 6. Set all dip switches off and the mode switch to Run.

If the remote control is to be used for Open Only and Close Only function then the dip switch 2 should be set as “ON” in normal Run mode.

### Photoelectric Beam Polarity

To change the photoelectric beam polarity, follow these steps:

- 1. Set dip switch 6 and 8 “ON”
- 2. Set dip switch 1 to 5 and 7 “OFF”
- 3. Set mode switch to program mode 1, the run LED will turn red
- 4. Press button “A” for normally open or button “C” for normally closed
- 5. Buzzer will beep to confirm the change was successful
- 6. Set mode switch to Run

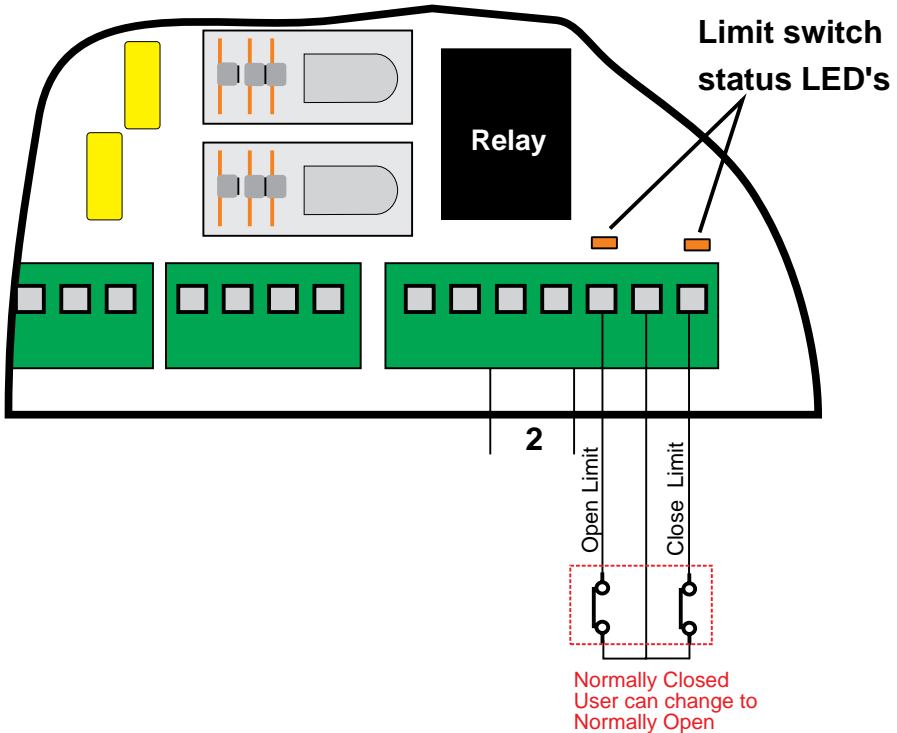
## Limit Switch

### – Internal Limit Switches

Internal motor limit switches are usually connected in series with the motor wires and they do not require any connection to the control card. Use travel timer to setup motor travel distances.

### – External Limit Switches Connected to the Control Card

If you are using external limit switches make sure they are connected to the control card as shown in the diagram below. Check the limit switch status LED's are indicating the correct status of the limit switches. LED "ON" means limit switch is activated.



To change the limit switch polarity from normally closed to normally open, follow these steps:

1. Set dip switch 8 "ON"
2. Set dip switch 1 to 7 "OFF"
3. Set mode switch to program mode 1, the run LED will turn red
4. Press button "A" for normally open limits or button "C" for normally closed limits
5. Buzzer will beep to confirm the change was successful
6. Set mode switch to Run



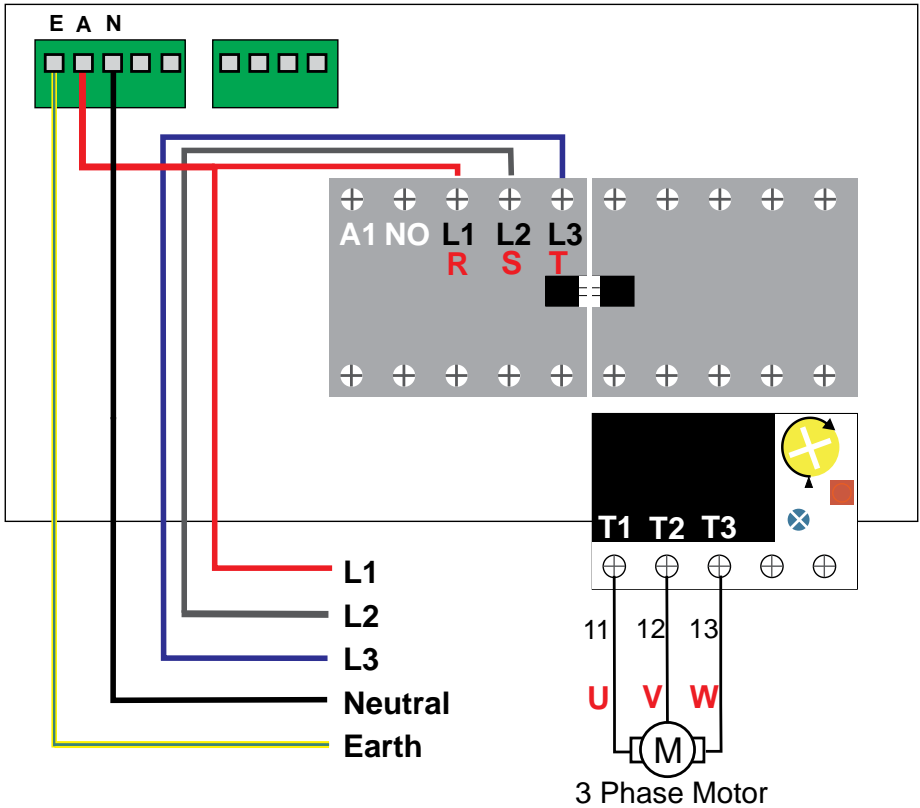
# Wiring Diagram for 3-phase with neutral

Connect the 3-phase supply and 3-phase motor as shown in the diagram below.



## Warning

Make sure that the mains power is always switched off before doing any wiring.



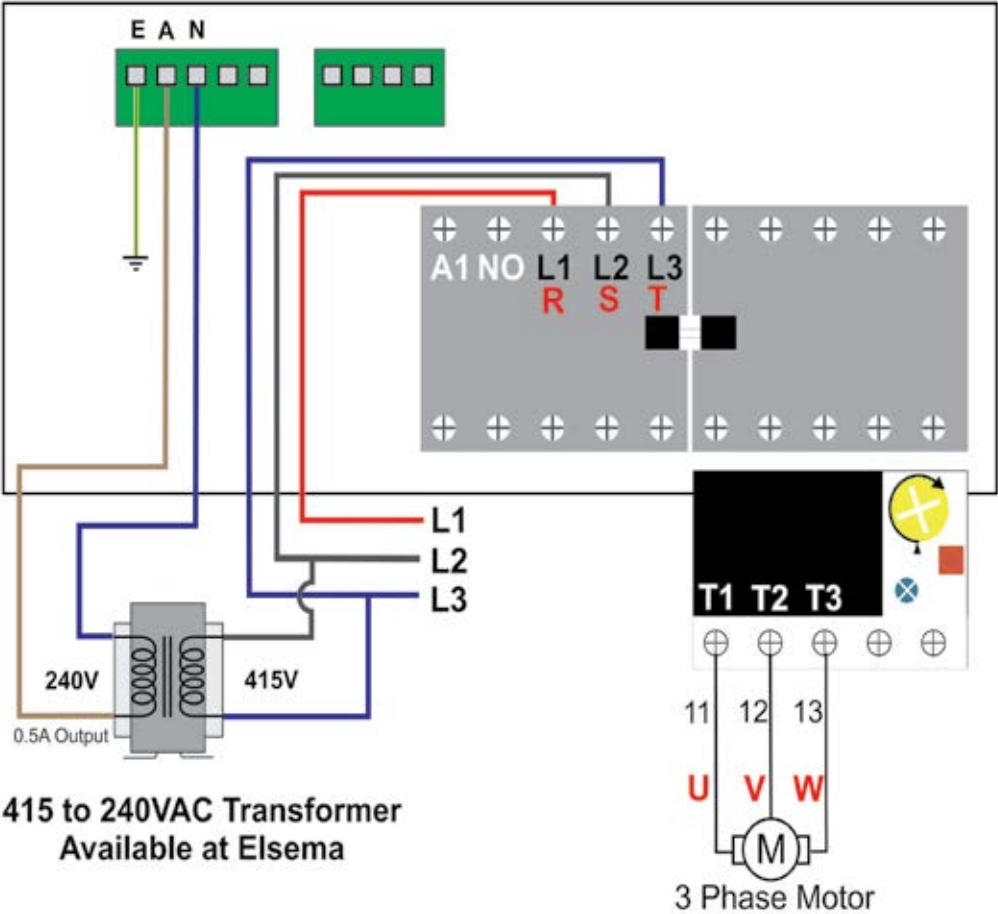
Wiring Diagram for 3-phase without neutral

Connect the 3-phase supply and 3-phase motor as shown in the diagram below.



Warning

Make sure that the mains power is always switched off before doing any wiring.



## Setup Travel Timer

Use travel timer setup if one of the following applies:

- Using internal motor series limit switches.
- Using linear motors or motors with a mechanical clutch.
- Using external limit switches and need more than 90 second travel time.

Do not use travel timer setup if you are using external limit switch inputs (Limit switches connected to the control card) and the total travel time from open to close is **less than 90 seconds**.

The travel timer can be programmed using the Push Button input, Remote Control input, Open Only Button input and Close Only Button input.

### Travel Timer Steps:

1. Close the door/gate fully and power up the control board
2. Set dip switch 7 "ON"
3. Set dip switch 1 to 6 and 8 "OFF"
4. Set mode switch to Program mode 1, the run LED will turn red
5. Press the Enter button, the open LED will start flashing
6. Press and hold the push button input or the remote control, door will start opening
7. Release the push button or remote when the door/gate reaches the fully open position
8. Press the Enter button, the close LED will start flashing
9. Press and hold the push button input or the remote control, door/gate will start closing
10. Release the push button or remote when the door/gate reaches the fully close position
11. Press the Enter button, the buzzer will beep for 2 sec to indicate learning is successful
12. Set mode switch to Run mode or change dip switch to exit learn mode

### Setup Pedestrian Access Travel Timer

Pedestrian access opens the gate/door for a short time to allow someone to walk through the gate/door but does not allow a vehicle access. The factory default pedestrian access travel timer is 3 seconds.

To change the default time, follow the steps below.

1. Close the door/gate fully and power up the control board
2. Set dip switch 6 "ON"
3. Set dip switch 1 to 5 and 7, 8 "OFF"
4. Set mode switch to program mode 1, the run LED will turn red
5. Press the Enter button, the open LED will start flashing
6. Press and hold the push button input or the remote control, door/gate will start opening
7. Release the push button or remote when the door/gate reaches the pedestrian access open position
8. Press the Enter button, the close LED will start flashing
9. Press and hold the push button or the remote control, door/gate will start closing

10. Release the push button or remote when the door/gate reaches the fully close position
11. Press the Enter button, the buzzer will beep for 2 seconds to indicate learning is successful
12. Set mode switch to Run mode or change dip switch to exit Pedestrian Access Learn mode

## Courtesy Light and Lock Time

Dip switch 6 allows you to setup the AUX relay output to either a light or lock output.

Dip switch 6 “OFF” in Run mode => AUX Relay output is courtesy light

Dip switch 6 “ON” in Run mode => AUX Relay output is lock

### Courtesy Light

Courtesy light time is as follows:

- On power up light is on for 60 seconds
- Light stays on for 60 seconds after the end of each run cycle.

### Controlling the Courtesy Light with a Remote Control

Button 2 of the remote can be set to operate the courtesy light by selecting dip switch 7 on. This will over ride the close function of button 2 of the remote if selected.





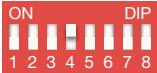





### Lock Time

When the auxiliary relay is programmed as a lock output the relay is activated for a set time on the opening and closing cycle. The factory default lock time is 2 seconds.

To change the default lock time follow these steps:

1. Set mode switch to Program Mode 1
2. Set dip switch 6 and 7 “ON”
3. Press Button A for the required duration of the lock time
4. Release Button A
5. Buzzer will beep to indicate lock time has been changed
6. Switch off all dip switches
7. Set mode switch to Run mode

# Dip Switch Functions

Feature	Dip Switch settings	Description
Auto Close	Dip switch 1 "ON" 	Auto close is a feature that automatically closes the gate/door after a preset time has counted down to zero. Adjust the auto close trimpot to change time between 3 – 60 seconds.
Remote Control Open Only and Close Only	Dip switch 2 "ON" 	By default the remote control allows the user to open and close the gate/door with button 1. This mode disables closing for the remote control on button 1 and moves the closing function to button 2 of the remote control.
Security Close	Dip switch 3 "ON" 	Gate/door will close as soon as the vehicle has passed through the photoelectric beam.
Photoelectric Beam	Dip switch 4 and 5 "OFF" 	Photoelectric beam stops and opens gate/door on close cycle
Photoelectric Beam (Special Security Close)	Dip switch 4 "ON" and 5 "OFF" 	Photoelectric beam stops gate/door on close cycle
Photoelectric Beam	Dip switch 4 "OFF" and 5 "ON" 	Photoelectric beam stops gate/door on open and close cycle
Photoelectric Beam	Dip switch 4 and 5 "ON" 	Photoelectric beam stops and closes gate/door on open cycle
Auxiliary Relay Courtesy Light or Lock	Dip switch 6 "ON" 	Dip switch 6 "OFF" - AUX Relay output is courtesy light Dip switch "ON" - AUX Relay output is lock
Auxiliary Relay 2 Channel Courtesy Light	Dip switch 7 "ON" 	Button 2 of the remote will switch "ON" the courtesy light for 60 secs
Auxiliary Relay Strobe Light	Dip switch 8 "ON" 	Aux Relay output is strobe light output. Relay is only activated when the gate/door is moving. Dip switch 8 "ON" overrides courtesy light and lock.

## Test Buttons and status LEDs

Each input has a built-in test button and a status LED. The test buttons are located behind the terminal blocks of each input. The status LED is next to the input test buttons.

## Fuse

The standard fuse included with the board is a slow blow 2 Amps (5 x 20mm).

## Resetting to Factory Default

This will reset the controller card back to its factory default settings.

1. Set dip switch 6, 7, 8 "ON"
2. Set dip switch 1 to 5 "OFF"
3. Set mode switch to program mode 2, the run LED will turn orange
4. Press Enter button for 5 seconds the buzzer will beep to confirm the resetting was successful
5. Set mode switch to Run mode.

## Accessories

### Key FOB Remote

The latest Penta series key fob remote with mini receivers ensures your gates or doors are secure.

Visit <http://www.elsema.com/key-fob.htm> for more details.



**PentaCODE® Series**



**PentaFOB® Series**

### Photoelectric beam

The photoelectric beam is usually used as a safety device to control automatic gates and doors. Elsema has several types of photoelectric beams including retro-reflective and through beam with IP-66 ratings for outdoor use.



**PE24**  
(Through-beam type)



**PE1500**  
(Retro-reflective type)

### Vehicle Loop Detectors

The digital technology of the loop detectors is used to detect metal objects such as motor vehicles, motor bikes or trucks. Loop detectors have become a popular tool having innumerable applications in policing, right from surveillance operations to traffic control. Automation of gates and doors has become a popular usage of the loop detector. The digital technology of the loop detector enables the equipment to sense a change in the inductance of the loop as soon as it detects the metal object in its path.



**MD12-1**  
(1 Channel)



**MD12-2**  
(2 Channel)



**MD2010**



**LD30-12**

Also available with 240VAC Supply Connection



## NOTES

**ELSEMA PTY LTD**

31 Tarlington Place  
Smithfield NSW 2164 Australia

**P** 02 9609 4668 **F** 02 9725 2663

**W** [www.elsema.com](http://www.elsema.com)